

# MONODIAMESA EKMANI BRUNDIN (DIPTERA: CHIRONOMIDAE), CONFIRMED NEW TO BRITAIN AND IRELAND

PETER H. LANGTON

3 St Felix Road, Ramsey Forty Foot, Huntingdon, Cambridgeshire PE17 1YH

AND LESLEY A. McLARNON

Freshwater Laboratory, University of Ulster, Traad Point, Ballyronan,  
Co. Londonderry BT45 6LR

On 16th August 1982 six *Monodiamesa* pupal exuviae with bulbous thoracic horns were collected by PHL from Loch Tay at Kenmore. Without associated adults their specific identity was uncertain. They were keyed in Langton (1991) as *Monodiamesa Pela*. In a manuscript list of additions to the British chironomid fauna, Langton (1993) provisionally recorded the species as *Monodiamesa ekmani* Brundin. Further material collected by LAM in Lough Neagh, Northern Ireland, during 1994/5 confirms the species to be *ekmani*. *Monodiamesa* adult development is extremely precocious, even for a chironomid: before the last instar larva has finished feeding there is already a well developed adult hypopygium within the pharate pupa. A male larva at this stage of development has provided characters to achieve specific identification, despite the distorted condition of the hypopygium. *M. ekmani* larvae were partially described by Brundin (1952) from non-cleared specimens; this new material allows for larval descriptions to match those given for Nearctic species by Sæther (1973). Only the female of *M. tuberculata* Sæther has been previously described (Sæther, 1973, 1977), and that from a decomposed pharate adult. A reared adult *ekmani* enables the first full description of a female *Monodiamesa*.

## LARVA

### *Fourth instar*

Material. Lough Neagh: single larvae 11.vi.94, 5.i.95, 29.iii.95, 12.vi.95; 1 larval exuvium 29.v.95 (LAM).

Length 8.7–10.2 mm ( $n=4$ ). Head capsule length 0.50–0.56 mm ( $n=4$ ).

Head. Antennal segments 50–60, 22–26, 5–8, 2  $\mu\text{m}$  long ( $n=3$ ). Basal antennal segment 18–22  $\mu\text{m}$  wide; distance from base to ring organ 25–28  $\mu\text{m}$ ; blade 11  $\mu\text{m}$  long (Fig. 1d). Labrum and palatum as in Fig. 1a. Premandible 56–70  $\mu\text{m}$  long ( $n=3$ ). Mandible (Fig. 1b) 110–145  $\mu\text{m}$  long ( $n=4$ ), seta interna with 6 serrated setae and 1 longer smooth seta. Mentum as in Fig. 1c, 6 lateral teeth, width between apices of lower mental teeth 105–115  $\mu\text{m}$  ( $n=3$ ). Ventromental plate with 2–6 ( $n=4$ ) fine setae underneath, maximum width of plate 20–22  $\mu\text{m}$  ( $n=4$ ), length from apex of lower mental tooth to plate apex 76–90  $\mu\text{m}$  ( $n=4$ ). Length of postmentum (mentum + submentum) 310–340  $\mu\text{m}$  ( $n=5$ ).

Abdomen. Procerci 65–90  $\mu\text{m}$  long ( $n=4$ ), each with 6–8 apical setae (440–620  $\mu\text{m}$  long) and 2 lateral setae (80–140  $\mu\text{m}$  long). Supraanal setae 360  $\mu\text{m}$  long ( $n=1$ ). Anal tubules 108–140  $\mu\text{m}$  long, 34–55  $\mu\text{m}$  wide ( $n=3$ ). Posterior parapods 200  $\mu\text{m}$  long ( $n=2$ ).

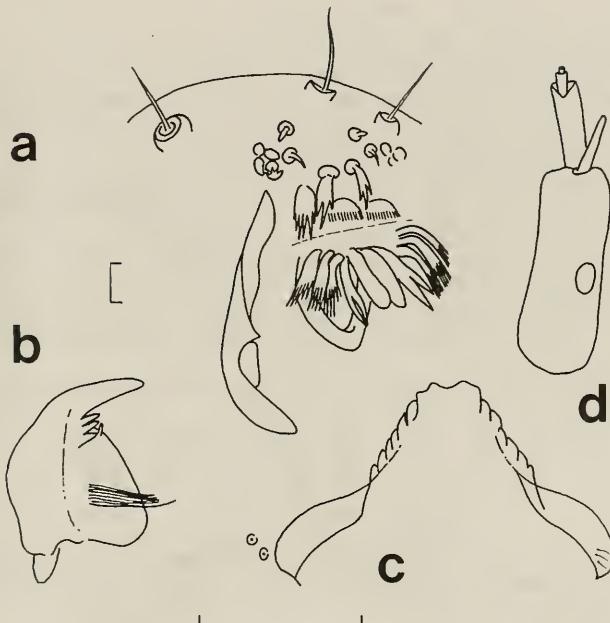


Fig. 1. *Monodiamesa ekmani* fourth instar larva. a: labrum and palatum; b: mandible; c: mentum; d: antenna. Scale a, d=0.01 mm; b, c=0.1 mm.

### Third instar

Material. Lough Neagh: 1 larva 29.iii.95 (LAM).

Length 5.3 mm. Head capsule length 0.32 mm.

Head. Antennal segments 26, 20, 4, • (unmeasurable on specimen)  $\mu\text{m}$  long. Basal antennal segment 11  $\mu\text{m}$  wide. Premandible 38  $\mu\text{m}$  long. Mandible 80  $\mu\text{m}$  long, with 6 setae in seta interna. Distance between apices of lower mental teeth 36  $\mu\text{m}$ . Ventromental plate with 2 fine setae underneath, maximum width of plate 14  $\mu\text{m}$ . length from apex of lower mental tooth to plate apex 40  $\mu\text{m}$ . Length of postmentum (mentum + submentum) 180  $\mu\text{m}$ .

Abdomen. Procerci 36  $\mu\text{m}$  long, each with 6 apical setae (160  $\mu\text{m}$  long). Supraanal setae 340  $\mu\text{m}$  long. Anal tubules 60  $\mu\text{m}$  long, 28  $\mu\text{m}$  wide. Posterior parapods 100  $\mu\text{m}$  long.

### PUPA

Loch Tay specimens are keyed and figured in Langton (1991) (*Monodiamesa Pela*).

New material: 1 pupal exuvium 29.v.95 Lough Neagh, Northern Ireland, from a reared female (LAM).

Exuvial length 7.6 mm. Thoracic horn 1.0 mm long, 2.6 times as long as wide. Anal lobes 1.4 times as long as broad.

### ADULT FEMALE

Material. Lough Neagh, 1 reared female 29.v.95 (LAM).

Colour. Gold; thorax with scutal stripes brownish, the median stripe darker anteriorly, the laterals with a brown spot posteriorly; posterior part of postnotum brown; a brown spot laterally below and a little in advance of the wing base; preepisternum browned beneath; legs brown from knees to claws.

Head. Setae: verticals + postorbitalis 7/9, clypeals 22. Palps: palpomeres 44, 64, 140, 100, 255 µm long. Antenna: pedicel 56 µm long, 25 µm wide; flagellomeres 76/80, 48/56, 56/60, 76, 76/80, 170/190 µm long, AR 5.6/6.8.

Thorax. Antepronotum with 10 lateral setae, 13 dorsocentral setae, 4 prealar setae, 1 supralar seta. Scutellum with about 25 setae. Wing 3.2 mm long. Costal extension 110 µm. Membrane without macrotrichia; brachiolium with 2 setae, R with 15/17, R<sub>1</sub> with 15/18, R<sub>4+5</sub> with 7, squama with fringe of 30 setae. Venarum ratio (length of Cu divided by length of M) 1.0.

Legs. (Lengths in µm. LR leg ratio; ratio of metatarsus length to tibial length.)

leg	fem	tib	tar1	tar2	tar3	tar4	tar5	LR
1	110	138	102	54	38	26	20	0.74
2	120	130	56	36	26	19	18	0.43
3	128	156	88	50	38	22	20	0.56

Leg spurs: on foretibia 55 µm long, midtibia 55, 55 µm long, hindtibia 65, 95 µm long; pseudospurs 30 µm long; on midleg 2 on first and second tarsal segments, on hindleg 2 on first tarsal segment. Comb of hind tibia with 14 spines.

Genitalia Fig. 2.

### OBSERVATIONS ON THE HYPOPYGIUM OF A PHARATE ADULT MALE

Figure 3 depicts the hypopygium of a male within a pharate pupa (12.vi.95, Lough Neagh, LAM). It is obviously severely distorted. Its interest lies in the double longitudinal folding of the larger of the basal appendages of the coxite: away from midline below, towards midline above. If this is the normal condition of the pharate male, presumably the appendage is flattened by hydrostatic pressure on eclosion.

### DISCUSSION

European *Monodiamesa* species are extremely similar. The bulbous thoracic horn of the pupa excludes *bathyphila* (Kieffer), and at 1 mm long or less, also *alpicola* (Brundin), for which a length of 1.4 mm is given by Brundin (1952). The wing length of the reared female and that derived from the Loch Tay pupal exuviae wingsheath lengths (using the conversion graph in Langton, 1984) is 3 mm. According to Pagast (1947) the winglength of *nitida* (Kieffer) is 4 mm; Brundin (1949) gives 3.2–3.5 mm for *ekmani*. The figure of the hypopygium of *nitida* in Reiss (1968) shows the basal spine of the coxite set on a distinct tubercle. Although the hypopygium figured here is distorted, the spine shows no basal tubercle, a character *ekmani* shares with *alpicola*. The conclusion is that the species described here is *ekmani*, despite the curiously squat gonostyles of the pharate male hypopygium (which, however, appears to have experienced some developmental trauma).

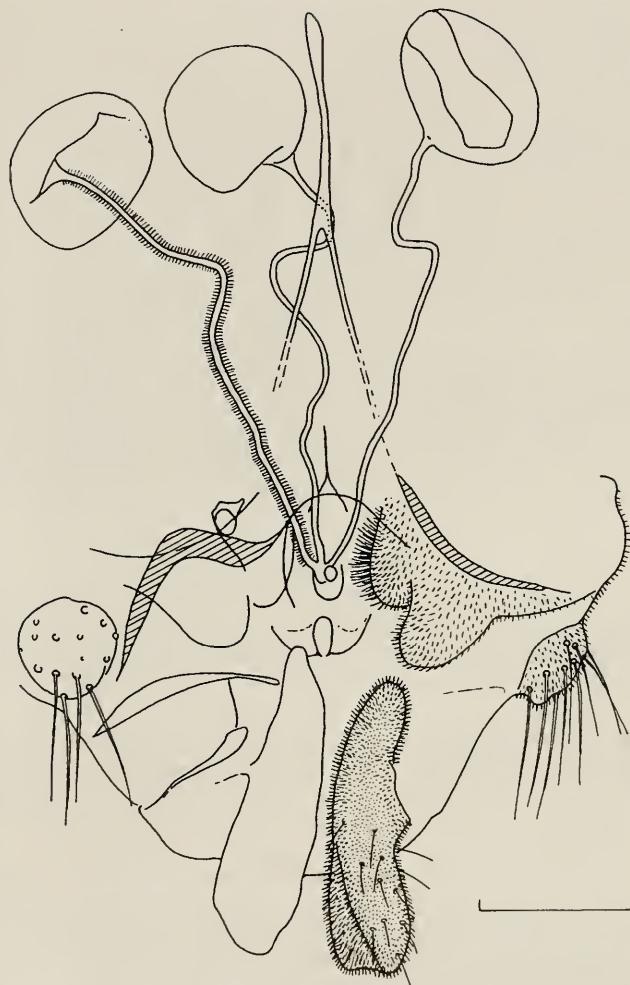


Fig. 2. *Monodiamesa ekmani* female genitalia ventral view. Scale = 0.1 mm.

#### ECOLOGY AND GEOGRAPHICAL DISTRIBUTION

Six pupal exuviae were collected on Loch Tay, on 16.viii.82. However, it is likely that the records for *Monodiamesa* sp. larvae collected in Lough Neagh during April 1982 (Carter & Carter, 1983) represent the earliest record of *ekmani* for the British Isles.

In the course of regular sampling by LAM and C. Carter in Toome Bay, at the north-west corner of Lough Neagh, *Monodiamesa* larvae were found throughout 1994 and 1995 at depths of 5 metres or less. Lough Neagh is the largest freshwater



Figure 3. *Monodiamesa ekmani* hypopygium of pharate adult male. Scale = 0.1 mm.

lake in the British Isles. It has a surface area of 383 km<sup>2</sup>, a catchment area of 4453 km<sup>2</sup>, an average depth of 8.9 m, a maximum depth of 34 m, a capacity of  $3.45 \times 10^9$  m<sup>3</sup> and a water retention time of approximately 1.3 y (Stevens & Gibson, 1977). The majority of its 125-km shoreline (Carter, 1993) is exposed and rocky; the remaining 32 km consists of sheltered sandy bays. Typically during the summer in the sandy bay area stands of *Phragmites australis* (Cav.) Trin ex Steudel and/or *Typha latifolia* L. replace stands of submerged macrophytes, e.g. *Elodea canadensis* Michx., *Potamogeton pectinatus* L. and *P. filiformis* Pers. (Carter & Murphy, 1993). The Brundin (1958) system of lake classification based on the bottom fauna would place the lough in the IIIa or moderately eutrophic category (Carter, 1973). However, other workers have pointed out that other factors such as nutrient levels and primary production would place the lough in a more eutrophic category (e.g. Carter, 1973). Annual average total phosphorus was 104.7 mg/m<sup>3</sup> (range 7–206) for 1994 and 120.5 mg/m<sup>3</sup> (range 58–200) in 1995 (J. Livingstone pers. comm.). This places the lough above the average for the eutrophic category according to the OECD report (1982). The morphology of the lough ensures that the water is well mixed and, apart from brief periods of calm weather during the summer, there is little thermal stratification or depletion of oxygen in the bottom waters (Gibson, 1986). Permanent ice cover in the winter months is extremely rare; only minimal freezing occurs around the lake margins. Below 8 metres the bottom sediment is mud (mean grain size 0.01 mm), above this there is a transitional zone (mean grain size 0.1 mm) and inshore the substratum consists of a mixture of sand (mean grain size 0.20–0.25 mm) and stones (Carter, 1973).

Brundin (1952) summarized the distribution of *ekmani* in Sweden: though widely distributed in subarctic lakes, it was known only from the Vättern in the south. He surmised that in south and middle Sweden it is most probably restricted to the deepest and coldest lakes (the Vättern has a surface area of 1900 km<sup>2</sup>, a maximum depth of 119 m and is oligotrophic (Brundin, 1949)). He also recorded larvae from a depth of 27 m in a northern lake, Stora Blåsjön. In contrast no larvae were obtained from Lough Neagh below five metres, where the numbers peak at around four metres, with a maximum of 1120/m<sup>2</sup> (C. Carter pers. comm.).

Loch Tay is the fourth largest Scottish Loch with a volume of about  $15 \times 10^8$  m<sup>3</sup>, a surface area of 26.4 km<sup>2</sup>, a mean depth of 61 m and a maximum depth of 155 m; like Lough Neagh it rarely freezes over (Murray & Pullar, 1977). In contrast to Lough Neagh, Loch Tay is oligotrophic, with an average annual total phosphorus concentration of 7 mg/m<sup>3</sup> (I. Fozzard pers. comm.).

According to Sæther (1983) *Monodiamesa* larvae are found most commonly on sandy substrata. Carter & Carter (1983) found the larvae on the crest of the sand bar closest to shore, but not on the crest of the outer bar, suggesting a low tolerance to disturbance. It would appear that some large lakes in temperate regions of the West Palaearctic can provide the undisturbed sandy substratum and year-round high oxygenation that *Monodiamesa ekmani* requires.

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## SHORT COMMUNICATION

**Drymus pumilio Puton (Hemiptera: Lygaeidae) in Surrey.**—A single example of this rare bug was swept from rideside weedy grassland in Preserve Copse immediately to the east of Polesden Lacey (TQ138522), 10.ix.1996. This wood is probably of plantation origin, having at present mature standard oaks of very uniform age plus a mixture of exotic tree species. The canopy is very sparse due to severe storm damage in 1987 and subsequent heavy suppression of any regrowth by rabbit grazing. The wood lies on the clay-with-flints cap of the North Downs and the soils are neutral. The grassland includes frequent *Hypericum perforatum*, a feature of other sites mentioned by Kirby (1992). This is a nationally scarce bug with a thin scattering of reports across lowland southern Britain from Kent to Monmouthshire, and equally scarce throughout its range—it appears to be confined to western Europe. So far as I am aware this is the first record from Surrey.—K. N. A. ALEXANDER, National Trust, 33 Sheep Street, Cirencester, Glos. GL7 1RQ.

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